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United States Department of the Interior
Bureau of Land Management
Miles City Field Office
Billings Field Office

State of Montana
Montana Board of Oil and Gas Conservation
Montana Department of Environmental Quality

January 2003

MONTANA

Final Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plans

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SUMMARY

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The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times. Management is based on the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation; rangelands; timber; minerals; watershed; fish and wildlife; wilderness; air; and scenic, scientific, and cultural values.

BLM/MT/PL-03/006

BUREAU OF LAND MANAGEMENT
Miles City Field Office
111 Garryowen Road
Miles City, Montana 59301-0940
http: www.mt.blm.gov mcfo

IN REPLY TO: 1310

Dear Reader:

The Bureau of Land Management (BLM), and the State of Montana, Department of Environmental Quality (MDEQ) and Board of Oil and Gas Conservation (MBOGC), have prepared the *Montana Final Statewide Oil and Gas Environmental Impact Statement (FEIS) and Proposed Amendment of the Powder River and Billings Resource Management Plans.* The Bureau of Indian Affairs, Crow Tribe, Department of Energy and the Environmental Protection Agency (EPA) are designated Cooperating Agencies in the EIS. The Northern Cheyenne Tribe declined to become a cooperating agency, but was invited by BLM to participate in all cooperating agency activities. Consultation with both the Crow and Northern Cheyenne tribes has taken place throughout the process to gather their input and concerns. Consultation with the U.S. Fish and Wildlife Service has also occurred. The BLM has also met with individuals from the public, special interest groups, industry, and local governments upon their request.

The FEIS and Proposed Amendment documents and discloses the results of the environmental analysis of anticipated coal bed methane and conventional oil and gas development in the State of Montana. The FEIS amends the State s 1989 *Programmatic Environmental Impact Statement on Oil and Gas Drilling and Production in Montana* to include coal bed methane exploration and production activities on private and state-owned lands. You may view the *Montana Final Statewide Oil and Gas Environmental Impact Statement (FEIS) and Proposed Amendment of the Powder River and Billings Resource Management Plans* on the following BLM, DEQ and MBOGC websites: http://www.mt.blm.gov/mcfo , and http://www.deq.state.mt.us/, and http://www.bogc.dnrc.state.mt.us/. Copies of the FEIS and Proposed Amendment are also available for public inspection at the following BLM and State offices:

Bureau of Land Management
Montana State Office
5001 Southgate Drive
Billings, Montana 59107

Bureau of Land Management
Miles City Field Office
111 Garryowen Road
Miles City, Montana 59301

Board of Oil and Gas Conservation
2535 St. Johns Avenue
Billings, Montana 59102

We recommend that you begin by reading the Summary of the FEIS and Proposed Amendment, which will orient you to the general outline of the document.

The BLM and the State have identified Alternative E as the Preferred Alternative for managing the State and BLM oil and gas activities. The Preferred Alternative provides for responsible management of coal bed methane in consideration of other resources. Although Alternative E is the preferred alternative for the State and BLM, each agency will issue its own Record of Decision to approve management decisions.

In the document, the word State refers to the appropriate State of Montana agency(s). State agencies have different jurisdictions, so the term State is used generically . For example, State can mean the Department of Natural Resources and Conservation or Fish, Wildlife, and Parks.

The Draft EIS (DEIS) was made available for public review and comment from February 15, 2002 through May 15, 2002. More than 18,000 letters, emails, faxes and cards were received. In response to the comments, a variety of changes were made throughout the document, including correction of errors, updating information on the MDEQ s permitting process for produced waters, clarifying and providing more detail on the alternatives, revising some of the models used to predict environmental effects, and providing some additional information concerning biological resources.

The BLM in Wyoming has also issued a FEIS that addresses oil and gas development in the Wyoming portion of the Powder River Basin. More information on the *FEIS and Proposed Planning Amendment for the Powder River Basin Oil and Gas Project* can be found at BLM website http://www.prb-eis.org.

To prepare the FEISs, BLM Montana and Wyoming worked cooperatively with the EPA and the Wyoming and Montana DEQs to ensure consistency where appropriate and improve the air and surface water quality impact analysis methods. For example, the agencies agreed to use common analytical assumptions and prepared a joint cumulative impact assessment for surface water based on information provided by the US Geological Survey (USGS). The Wyoming FEIS includes an updated air quality analysis that is consistent with the model used in the Montana FEIS. Both documents include an expanded section on water and air quality monitoring and the roles and responsibilities of the agencies in regards to issuing permits for water discharges and air emissions. Both documents describe in more detail some of the mitigation options available to the permitting agencies to ensure compliance of all activities with the Clean Air Act and Clean Water Act.

Where differences in certain analytical assumptions are still warranted, the rationale for the assumption is better explained in the FEISs. For example, both EISs now use 6.2 gallons per minute as the figure for water production from coal bed methane wells during the time of maximum total field water production, and impacts are calculated based upon this maximum water production rate. However, because the Montana FEIS and Proposed Amendment covers all lands within the state of Montana and since there is data on Montana wells outside the Powder River Basin that indicate such wells may last up to 20 years, the Montana FEIS and Proposed Amendment continues to note a 2.5 gpm average for water production over a 20 year period.

Some reviewers of the Draft EISs suggested the EISs be combined because of their similarities and to better address cumulative effects. The Final EISs are being issued separately primarily because the documents involved different cooperators and co-leads with independent jurisdictions and legal responsibilities. In addition, the Montana FEIS and Proposed Amendment covers the entire state of Montana while the Wyoming FEIS addresses only lands within the Wyoming portion of the Powder River Basin. Finally, most of the information and analyses presented in the documents is specific to the lands and resources within each state, or as is the case for the surface water quality analysis, individual watersheds. To combine such a volume of information would have made the documents impracticable to read and to address issues over such an extensive area would have made it extremely difficult to identify the information relevant to the decisions to be made in each state by each agency.

Some reviewing agencies suggested the BLM issue a Supplemental Draft EIS due to the extensive nature of the comments provided by the reviewing agencies. Largely due to the coordinated efforts of the BLM, EPA, Montana co-leads and Wyoming DEQ to be responsive to public comments, numerous changes were made in the FEISs, as noted above. BLM carefully evaluated the need to issue a supplement and determined that though the FEISs have been greatly improved since the Draft EISs, the agency did not make substantial changes in the preferred alternative. In addition, some information was included in the Final EISs that was not available when the Draft EISs were released. However, BLM determined that there were no significant new circumstances or information relevant to environmental concerns and bearing on the preferred alternative or its impacts. Therefore, the BLM is not required to prepare a supplement to the Draft EISs.

The MBOGC will hold a public hearing on the FEIS. This hearing is expected to take place at the February 2003 regularly scheduled Board hearing in Billings. In addition to the customary meeting notices the Board s meeting schedule is available at its website: http://www.bogc.dnrc.state.mt.us/. Subsequent to the public hearing, the Board will issue its own (separate from BLM) Record of Decision.

The BLM Planning Regulations, 43 CFR 1610.5-2, state that any person who participated in the planning process and has an interest which may be adversely affected may file a protest with the BLM Director. A protest may only raise those issues which were submitted for the record during the planning process. The protest shall be filed within 30 days of the date the EPA publishes the notice of receipt of the *Montana Final Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plans* in the *Federal Register*. See information pertaining to the BLM protest procedures on the page following the Dear Reader letter.

The decisions associated with the FEIS and Proposed Amendment are not the final reviews and approvals for actions associated with coal bed methane development in Montana. The BLM and the State must conduct the appropriate level of environmental review prior to approving the various components of the plan that involve ground disturbance. At the time such approvals are granted, those decisions will be subject to administrative reviews according to the applicable regulations of the approving agency.

Please retain this copy of the FEIS and Proposed Amendment for future reference. If you have any questions or require additional copies of the document, please call the Coal Bed Methane Hotline at 406-233-3649. We appreciate your interest in the management of the public lands.

Sincerely,

Jan P. Sensibaugh
Montana Department of Environmental Quality

Tom Richmond
Montana Board of Oil and Gas Conservation

David Mellnay
Bureau of Land Management

BLM Protest Procedures

All protests must be sent in writing to:

Regular Mail

Director, Bureau of Land Management
Attention: Ms. Brenda Williams, Protest Coordinator
P.O. Box 66538
Washington D.C. 20035

Overnight Mail

Director, Bureau of Land Management
Attention: Ms. Brenda Williams, Protest Coordinator
1620 L Street, N.W., Room 1075
Washington, D.C. 20036
[Phone: 202-452-5045]

Protests filed late, or filed with the State Director, or Field Manager, shall be rejected.

There is no provision for any extension of time for the 30-day protest period provided in the planning regulations.

The resolution of protests is the responsibility of the Director of the BLM whose decision is the final decision of the Department of the Interior. The decision will be in writing and set forth the reasons for the decision. The decision will be sent to the protesting party by certified mail, return receipt requested.

The Planning Regulations at 43 CFR 1610.5-2, state that the protest shall contain:

1) The name, mailing address, telephone number, and interest of the person filing the protest.

2) A statement of the issue or issues being protested.

3) A statement of the part or parts of the plan being protested.

4) A copy of all documents addressing the issue or issues that were submitted during the planning process by the protesting party or an indication of the date the issue or issues were discussed for the record.

5) A concise statement explaining why the State Director s decision is believed to be wrong.

FINAL
STATEWIDE OIL & GAS
ENVIRONMENTAL IMPACT STATEMENT
AND
PROPOSED AMENDMENT OF THE POWDER RIVER AND BILLINGS RESOURCE MANAGEMENT PLANS

U.S. Department of the Interior
and
State of Montana

December 23, 2002

Recommended by: _____
Sandra S. Brooks, Billings Field Manager

Recommended by: _____
David McIlnay, Miles City Field Manager

Recommended by: _____
Jan P. Sensibaugh, Director, MT DEQ

Recommended by: _____
Thomas P. Richmond, Administrator, MBOGC

Approved by: _____
Dave Ballard, Chairman, MBOGC

Approved by: _____
Thomas P. Lonnie, Acting State Director, Montana BLM

Final Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plans

Lead Agencies: U.S. Department of the Interior, Bureau of Land Management (BLM); and the State of Montana, Board of Oil and Gas Conservation and Department of Environmental Quality.

Type of Action: Administrative

Jurisdiction by Agency (Planning Area):

- *State of Montana:* Statewide.
- *BLM:* Powder River RMP Area—Powder River, Carter, and Treasure counties and portions of Big Horn, Custer and Rosebud counties. Billings RMP Area—Carbon, Golden Valley, Musselshell, Stillwater, Sweet Grass, Wheatland, and Yellowstone counties and the remaining portion of Big Horn County. The planning area for the BLM contains 1,506,011 acres of federally managed surface, and 5,009,784 acres of federal mineral estate.

Abstract: The BLM and the State of Montana analyzed alternative approaches for managing oil and gas resources in this Final Environmental Impact Statement (EIS). As required by the National Environmental Policy Act (NEPA), the EIS is intended to "provide full and fair discussion of significant environmental impacts, and shall inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment" (43 Federal Register 55994, Section 1502.1).

Alternative E is the Preferred Alternative. This alternative would amend the Resource Management Plans and allow coal bed methane (CBM) exploration and development while minimizing impacts on environmental resources. The Preferred Alternative, as described in this Final EIS, provides a comprehensive framework for managing oil and gas resources on these public lands.

Four other alternatives were analyzed to evaluate different CBM exploration and production scenarios. Alternative A, the No Action Alternative, would continue existing management. Alternative B would allow CBM development while emphasizing protection of soil, water, air, vegetation, wildlife, and cultural resources. Alternative C would emphasize CBM development with minimal environmental restrictions. Alternative D would encourage CBM exploration and development while maintaining existing land uses.

All five alternatives are discussed in detail in Chapter 2. Chapter 3 presents the existing environment that would be affected by oil and gas development. Chapter 4 describes the impacts from each of the alternatives in terms of their impacts on the following resources:

- *Physical Resources:* Air Quality, Geology and Minerals, Hydrology, Soils, Solid and Hazardous Wastes, Vegetation, Visual Resources, Wilderness Study Areas, and Wildlife and Aquatics
- *Tribal, Historical, and Cultural Resources:* Cultural, Indian Trust Assets, and Paleontology
- *Human Resources:* Lands and Realty, Livestock Grazing, Recreation, and Social and Economic Resources

Further information regarding this Final EIS is available from the contact below or at the BLM website (http://www.mt.blm.gov). The BLM intends to issue a Record of Decision no sooner than 30-days after the Notice of Availability for this EIS published in the *Federal Register*.

Bureau of Land Management
Miles City Field Office
111 Garryowen Road
Miles City, MT 59301
Telephone: (406) 233-3649

SUMMARY

Introduction

The Bureau of Land Management (BLM) and the Montana Department of Environmental Quality (MDEQ), and Montana Board of Oil and Gas Conservation (MBOGC), (State) as joint lead agencies, have prepared the Statewide Oil and Gas Final Environmental Impact Statement (FEIS) and Amendment of the Powder River and Billings Resource Management Plans (RMPs). This FEIS focuses on the potential impacts of coal bed methane (CBM) exploration and production in 16 counties of south-central and southeastern Montana. The effects of anticipated conventional oil and gas development is also analyzed.

This summary discusses the following information:

- The planning area analyzed in the FEIS.
- The federal and state agencies responsible for preparing the FEIS.
- A brief explanation of what CBM is and why it occurs in coal beds.
- A summary of the purpose of and need for the FEIS.
- An explanation of how the FEIS conforms with the Powder River and Billings RMPs.
- A description of the environmental issues discussed in Chapters 3, 4, and 5 of the FEIS.

The Planning Area

The Powder River and Billings RMP Areas, located in south-central and southeastern Montana, constitute the BLM planning area or analysis areas for this FEIS. See the location map on the next page.

The State of Montana planning area is statewide, with an emphasis on the BLM planning area plus Blaine, Gallatin, and Park counties.

Preparers of the FEIS

The BLM and the State are the joint lead agencies responsible for preparing this FEIS. As lead agencies, BLM and the State are responsible for compliance with the National Environmental Policy Act (NEPA) of 1969 and Montana Environmental Policy Act (MEPA), respectively.

The information and proposed decisions discussed in the plan are not final until the BLM and the State sign separate Records of Decision (RODs). The ROD for BLM is signed no sooner than 30 days after the FEIS is published. The BLM will take any protests into account before signing the ROD.

The following agencies and tribes assisted the BLM and the State in the preparation of this FEIS:

- U.S. Environmental Protection Agency (EPA)
- Department of Energy (DOE)
- Bureau of Indian Affairs (BIA)
- Crow Tribe of Indians

As designated Cooperating Agencies, the EPA, DOE, BIA, and the Crow Tribe of Indians assisted the BLM throughout the FEIS analysis. The Northern Cheyenne Tribe, while not a formal cooperating agency, has also assisted the BLM and the State with preparation of the FEIS.

The cooperators' assistance included the submission of technical information and frequent consultation meetings with the BLM and the State to discuss issues and concerns along with possible mitigation measures. The cooperators may use or reference the FEIS for their future actions.

Coal Bed Methane

CBM is a natural hydrocarbon gas, primarily methane (CH_4), that occurs in beds of coal. Coal beds developed when dead plant material collected in ancient swamps and bogs. Once preserved and covered by soil and rocks, the plant material began to decay and to lose water, becoming more compact and dense, and its temperature began to increase. Over thousands of years, these natural processes ultimately produced various types of coal. Methane is usually found in sub-bituminous and bituminous coals.

What does the Summary Include?

The sections in this summary are the same as the five major chapters within the Final Environmental Impact Statement (FEIS). In most cases, second-level headings in the summary cover the same information as the same headings in the FEIS. Readers of this summary with questions should go to the parallel chapter or section in the FEIS.

CBM exploratory wells are drilled in an attempt to find viable commercial quantities of trapped methane. If the CBM exploratory wells are successful, additional wells are drilled to produce the methane by bringing it to the surface where it is processed and transported through pipelines to markets. Currently, the only methane production in Montana is from approximately 250 wells at the CX Field near Decker, Montana.

Chapter 1: Purpose and Need

The purpose of the EIS for both the BLM and the State of Montana is to analyze potential impacts from projected oil and gas activities, particularly from CBM exploration, production, development, and reclamation activities. The analysis is presented in 5 different alternatives which include different options for the management of CBM activities while protecting other resources and land uses. For BLM, the EIS analyses projected activities in the Billings and Powder River RMP areas, and for the State, the EIS analyses projected CBM activities statewide, emphasizing 16 counties with the greatest potential for CBM development.

This EIS is being used to analyze options for BLM to change its planning decisions by considering oil and gas management options including mitigating measures that will help minimize the environmental and social impacts related to CBM activities. The alternatives presented provide a range of management options for amending the RMPs. The preferred alternative (Alternative E) is BLM's proposed RMP amendment. The EIS will focus the analysis on the oil and gas development issues not covered in the current RMPs, such as water management from CBM production.

An analysis of CBM activities is needed for the State to supplement the State of Montana Oil and Gas Drilling and Production EIS and to provide the foundation for establishing CBM permitting guidance. The EIS also responds to the Stipulation and Settlement Agreement, dated June 19, 2000, between the Montana Board of Oil and Gas Conservation and the plaintiff, Northern Plains Resource Council.

Conformance with BLM Land Use Plans

This FEIS considers alternatives that would amend the two BLM RMPs:

- The Billings RMP issued by BLM on September 28, 1984, and subsequently amended to consider oil and gas development in 1994
- The Powder River RMP issued by the BLM on March 15, 1985, and subsequently amended for oil and gas in 1994
- The 1994 amendment to the RMPs analyzed oil and gas leasing operations and management actions on BLM administered lands.

Consultation

As part of the scoping effort, BLM and the State consulted with the U.S. Fish and Wildlife Service (FWS), regarding analysis in the FEIS and compliance with the Endangered Species Act.

In addition to the lead agencies, a number of state departments were consulted, including the Montana Bureau of Mines and Geology (MBMG), the Montana Department of Fish, Wildlife, and Parks (MFWP), the Montana Natural Resources and Conservation (DNRC), and the Montana State Historic Preservation Office (MSHPO).

Finally, consultation included meetings with the two Native American tribes with land in the planning area: the Crow Tribe of Indians and the Northern Cheyenne Tribe. Also the Lower Brule Sioux Tribe has areas of historic use within the planning area. The BLM has met with the Tribe to discuss their concerns about CBM development.

Issues Developed During Scoping

The BLM and the State identified a number of resource issues to be analyzed in the EIS. The list of issues was expanded as a result of comments received from the public during the scoping period. The issues are briefly described in the following paragraphs.

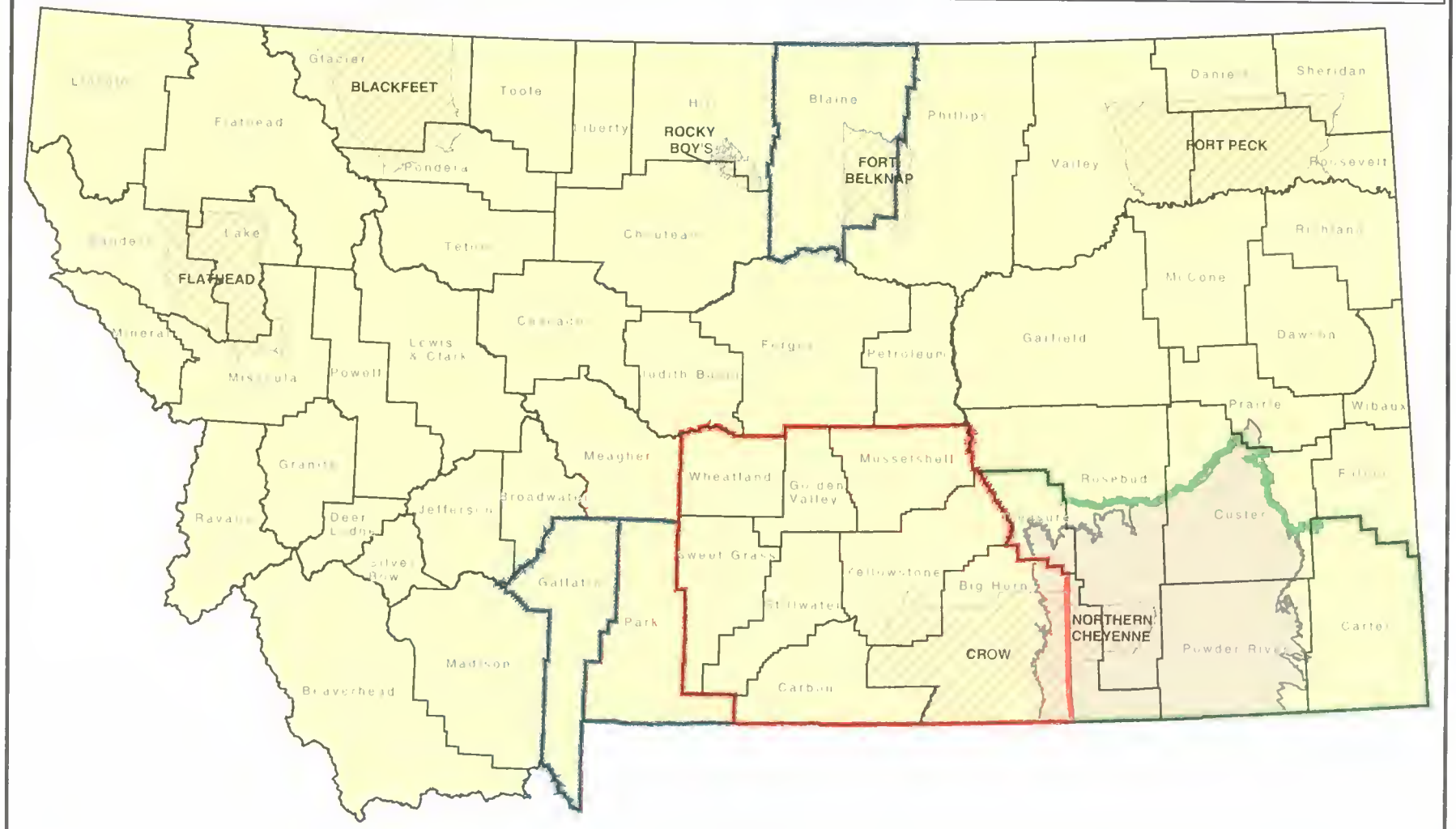
Air Quality and Climate

CBM wells and their associated pumps and other equipment could affect air quality both locally and region-wide.

Cultural Resources

CBM development activities and associated ground disturbance could inadvertently impact undiscovered cultural resource sites.

Map S-1: Planning Areas



Legend

- Billings RMP Area
- Powder River RMP Area
- Special Consideration Counties
- Native American Reservations
- Powder River Geologic Basin

1:4,000,000

50 25 0 50 Miles

50,000 0 50,000 100,000 Meters

DATA SOURCES

Counties 1:100,000 scale, counties, Montana State Library NRIS, Helena, Montana
Reservations. 1:100,000 scale, counties, Montana State Library/NRIS. Helena, Montana
Powder River Geologic Basin 1:250,000 scale, USGS Professional Paper 1625a

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Geology and Minerals

CBM development may influence or delay the mining of coal, or could change production priorities related to the production of oil and gas.

Hydrology

In order to release CBM from coal seams, the pressure in the coal seam must be reduced. This is practically achieved by pumping out groundwater. Groundwater produced in association with CBM is typically a sodium-bicarbonate type water having a higher salinity and more sodium relative to other cations than local surface waters. The storage and treatment of such produced waters can be an environmental problem, especially if waters are to be released untreated into existing streams. If produced waters are properly treated, or of suitable quality, they can be a beneficial resource for such uses as irrigation, dust control, or livestock watering.

Indian Trust Assets

The BLM is mandated to protect all Indian trust assets, which include Reservation water, air, soil, vegetation, water rights, hunting rights, and mineral rights. CBM wells have the potential to affect any or all of these trust assets.

Lands and Realty

CBM wells and their associated road and utility corridors potentially impact existing land use, either changing or decreasing possible uses.

Livestock Grazing

Land for proposed CBM wells often are part of existing grazing allotments. As such, well construction and production could change grazing patterns on these allotments.

Paleontological Resources

Ground disturbance during CBM well construction has the potential to impact undiscovered paleontological resources.

Recreation

CBM wells and their associated development activities could decrease existing recreation activities, including hunting, hiking, and other backcountry activities.

Social and Economic Values

CBM wells will bring new sources of revenue into the counties and towns of Montana. These new sources of revenue also affect the social and economic conditions of the residents in these towns and counties.

Soils

CBM wells necessarily include some ground disturbance. Disturbance of soils has the potential to increase sediment in nearby streams and to reduce soil productivity. The discharge of production water also has the potential, depending on handling methods, to change the chemistry of soils and reduce their productivity.

Vegetation

Ground disturbance and water discharges from CBM wells can affect the health and productivity of nearby vegetation. Increased human activities associated with drilling and maintenance practices can introduce noxious weeds.

Wildlife, Including Special Status Species

CBM well development has the potential to affect both listed and non-listed species. Such effects include impacts both on the species and on their habitats. Special status species include listed fish and plants, as well as listed bird and wildlife species, such as bald eagles, grizzly bears, or the Canada lynx.

Visual Resources

CBM wells and their associated roads and utility corridors are visually noticeable to anyone choosing to hike, hunt, or use the natural resources within the project area.

Wilderness Study Area

CBM exploration and development could potentially impact wilderness study areas.

Chapter 2: Alternatives

The FEIS presents five alternatives that describe and analyze different actions regarding the management of CBM activities. The No Action Alternative describes and analyzes current management of CBM activities by BLM and the State while the other four alternatives describe and analyze other management actions that provide different methods of protection to other resources and land uses from CBM activities. The five alternatives analyzed in detail are summarized in Table S-1.

Alternatives Considered

The alternatives analyzed in detail are summarized in Table S-1, and are described briefly below.

Alternative A—No Action (Existing CBM Management)

BLM would continue to review and approve APDs for conventional oil and gas and for CBM wells in accordance with the 1994 Oil and Gas Amendment.

Approved APDs would include only CBM exploration wells, not production wells. The State would conduct its permitting process by complying with the Stipulation and Settlement Agreement dated June 19, 2000. Under this agreement, the State can approve up to a maximum of 325 producing wells in the CX Field and 200 exploratory CBM wells throughout the rest of the state.

Alternative B—CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife, and Cultural Resources

BLM and the State would review and approve CBM activities with an emphasis on resource protection. BLM and the State would use stringent mitigation measures to minimize or eliminate adverse impacts to other resources. Examples of such mitigation measures would include requiring the injection of water produced with CBM and requiring all compressors to be fueled by natural gas rather than by diesel or electricity.

Alternative C—Emphasize CBM Development

BLM and the State would review and approve CBM activities with an emphasis on facilitating production of CBM. BLM and the State would use the least restrictive mitigation measures to minimize or eliminate adverse impacts to other resources. Examples of such measures would be to authorize the discharge of water produced with CBM onto the ground or into the water bodies when the discharge water meets applicable standards. Compressors could be fueled by gas, diesel, electricity, or other means as long as other permitting standards, such as air quality, are met.

Alternative D—Encourage CBM Exploration and Development While Maintaining Existing Land Uses

BLM and the State would review and approve CBM activities with an emphasis on maintaining or enhancing land uses in combination with CBM development. BLM and the State would use mitigation measures, as much as possible, that compliment the needs of land owners and other lessees. Management of water produced with CBM would be greatly influenced by the surface owner. The water could be made available for beneficial uses or may be required to be reinjected. Location of facilities, such as compressors, would be influenced by the needs of the land owner.

Alternative E—Preferred CBM Development Alternative

BLM and the State would review and approve CBM activities in a manner that facilitates efficient and orderly CBM activities while providing the appropriate type of resource protection on a site specific basis as well as an ecosystem basis. Different management actions, such as discharge, impoundment, reinjection or beneficial use, would be applied to water produced with CBM. Likewise, different management actions such as location, size, and mufflers (as required) would be applied to compressors. Also, realty questions, such as the handling of surface disturbance, would be handled by requiring the operator to consult with the owner of the surface rights.

Comparison of Impacts

Table S-2, provided at the end of this Summary, is the same as Table 2-3 in the FEIS. Table S-2 summarizes and compares the impacts of the alternatives.

TABLE S-1

ALTERNATIVE MANAGEMENT FOR CBM

Issue Topic	Management Action	Alternative A—No Action (Existing CBM Management)	Alternative B—CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife, and Cultural Resources	Alternative C—Emphasize CBM Development	Alternative D—Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E—Preferred CBM Development Alternative
Air	Maximize the number of wells connected to each compressor	No	Yes	No	Yes	Yes
	Type of fuel to power compressors	Diesel, electric, or gas-fired	Gas-fired	Diesel, electric, or gas-fired	Gas-fired with electric boosters	Gas-fired or electric boosters
	Noise suppression required	No	No	No	No	Yes
	Implementation of a speed limit on CBM roads on BLM	No	Yes	No	Yes	Yes
	Air permit analysis	Yes	Yes	Yes	Yes	Yes
Coal Mines	Buffer zone (1 mile) around active coal mines	No	Yes	No	Yes	No
Coal Bed Methane	APD to be filed and approved prior to drilling	Yes	Yes	Yes	Yes	Yes
	CBM exploration limits	Yes	No	No	No	No
	CBM production limits	Yes	No	No	No	No
	Project Plan of Development required in consultation with tribes, surface owners, and other agencies	No	No	No	No	Yes
	Directional drilling required	No	Yes	No	Yes	Yes, unless exempted
	Multiple coal seams developed per well bore required	No	Yes	No	Yes	No

TABLE S-1

ALTERNATIVE MANAGEMENT FOR CBM

Issue Topic	Management Action	Alternative A—No Action (Existing CBM Management)	Alternative B—CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife, and Cultural Resources	Alternative C—Emphasize CBM Development	Alternative D—Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E—Preferred CBM Development Alternative
Coal Bed Methane, 'cont.	Simultaneous coal seam development required	No	Yes	No	Yes	No
	Wellhead camouflage required by BLM	No	No	No	Yes	Yes
Hydrology	Exploration water disposal	Untreated and stored, except for CX Ranch	Untreated and stored	Untreated surface discharge	Treated and conveyed	Exploration Water Management Plan required
	Production water disposal	CX Ranch only	Injection	Untreated surface discharge	Treated and conveyed	Various Methods Water Management Plan Required
	Site-specific Water Management Plan required	Yes	No	No	No	Yes
	Exploration/production water available for beneficial use	Yes	No	Yes	Yes	Yes
Realty	Corridors required	No	Yes	No	Yes	No, with surface owner consultation
	Powerline placement	Aboveground or buried	Buried	Aboveground or buried	Buried	Aboveground or buried
	Abandoned access roads	Agency/Surface Owner Discretion	Agency/Surface Owner Discretion	Agency/Surface Owner Discretion	Agency/Surface Owner Discretion	Agency/Surface Owner Discretion
	High fire danger restrictions	No	Yes	No	Yes	Yes
	Road use enforcement on BLM	No	Yes	No	Yes	No

TABLE S-1

ALTERNATIVE MANAGEMENT FOR CBM

Issue Topic	Management Action	Alternative A—No Action (Existing CBM Management)	Alternative B—CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife, and Cultural Resources	Alternative C—Emphasize CBM Development	Alternative D—Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E—Preferred CBM Development Alternative
Realty, 'cont.	Road placement on boundaries on BLM	No	Yes	No	No	Yes
Indian Trust and Native American Concerns	Buffer zone (2 miles) around reservations	No	Yes	No	Yes	No
	Monitoring wells required on BLM-administered minerals that abut reservations	No	No	No	No	Yes
	Resource protection protocols	No	No	No	No	Yes
	Air quality mitigation measures	No	No	No	No	Yes
	Special cultural resources protection measures	No	No	No	No	Yes
Vegetation	Commercially harvest ROW trees on BLM	No	Yes	No	No	Agency or Surface Owner Discretion
	Revegetate with early successional and late seral stage plants on BLM	Agency or Surface Owner Discretion	Agency or Surface Owner Discretion	Agency or Surface Owner Discretion	Agency or Surface Owner Discretion	Agency or Surface Owner Discretion
	Noxious weed control by operator	Yes	Yes	No	Yes	Yes

TABLE S-1

ALTERNATIVE MANAGEMENT FOR CBM

Issue Topic	Management Action	Alternative A—No Action (Existing CBM Management)	Alternative B—CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife, and Cultural Resources	Alternative C—Emphasize CBM Development	Alternative D—Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E—Preferred CBM Development Alternative
Wildlife	Wildlife surveys required by BLM	Yes	Yes	Yes	Yes	Yes
	Gray wolf, Canada lynx and grizzly bear surveys by BLM	As needed	As needed	As needed	As needed	Yes
	FWS biological opinion mitigation measures on BLM	No	Yes	Yes	Yes	Yes

This comparison of impacts defines the resource issues and to distinguishes between the alternatives. See the text in the Environmental Consequences section below for additional highlights of the environmental impacts.

Chapter 3: Affected Environment

This chapter in the FEIS does not present impacts. It describes what is currently present or happening within the counties being analyzed.

The affected environment includes the physical, biological, social, and economic resources that the alternatives could impact. For the BLM, these resources are in two resource planning areas located in south-central and southeastern Montana. For the state, the analysis area includes all Montana counties, not just the 16 counties covered in the emphasis area analysis. Despite this statewide analysis area, the resource information in Chapter 3 of the FEIS focuses on conditions within the core 16 counties.

Several federally recognized Indian tribes own land within the emphasis area analyzed in the FEIS. These tribal governments include the Crow Tribe of Indians, the Northern Cheyenne Tribe, The Lower Brule Sioux Tribe, the North Dakota Turtle Mountain Tribe, and the Fort Belknap Indian Community (Gros Ventre and the Assiniboine). Their land holdings are an important share of the planning area:

- The Crow Reservation comprises nearly 2,296,000 acres in south-central Montana.
- The Northern Cheyenne Reservation comprises about 445,000 acres in southeastern Montana, and lies just east of the Crow Reservation.
- The North Dakota Turtle Mountain Tribe has approximately 61,250 acres of federal trust lands allotted to their members, which are scattered throughout the emphasis area.
- The Fort Belknap Indian Reservation comprises about 623,000 acres and lies in north-central Montana.
- The Lower Brule Sioux Tribe has also contacted BLM about the allotted lands held in trust by the federal government in the emphasis area, along with numerous traditional cultural sites.

These Native American land holdings share many of the same resource values as those summarized below for the entire state of Montana.

Resources in the emphasis area are described in the FEIS based on the scope and intensity of the potential impacts. The following bullet points highlight the existing resource conditions. For more information about the resources in the study area, see Chapter 3 in the FEIS.

- Air quality is generally very good, based on few industrial emission sources and on scattered residences in small communities and isolated ranches.
- The area is rich in cultural resources, especially historic sites, including fur trading posts, homesteads, emigrant and stage trails, Indian war battle sites, ranch centers, and many Native American sites (the use of which continued well into the historic period).
- Minerals include uranium, gold, silver, gypsum, vanadium, and bentonite. Oil and gas resources are scattered across the analysis area. Extensive coal beds are an especially important resource in south-central and southeastern Montana.
- Surface water is the primary water source for Montana users. The quality of surface water is generally good to fair, but some problems with salinity occur during periods of low flow. Groundwater is a minor source of usable water, however in some areas groundwater is the only source of water for domestic stock use. Groundwater quality is sometimes a problem, often making it unsuitable for irrigation, however it typically meets standards for domestic and stock use.
- Indian trust assets include lands, timber, water resources, other natural resources, and assets held in trust by the U.S. government for Indian tribes and individual Indians.
- Livestock grazing is an important economic activity. The planning area includes some 1,205 federal grazing allotments, covering about 1.6 million acres of federal land.
- Recreation is an increasingly important feature of the Montana economy. Large areas of federal and state land are dedicated to recreation, including land for fishing, hunting, hiking, photography, wildlife viewing, water sports, off-road vehicle activities, camping, touring, and caving.
- Population within the 16-county emphasis area is increasing at an average annual rate of 1.2 percent. Socio-economic data from the 2000 census shows a total population of about 286,000 people in the

emphasis area. These residents, along with the many thousands who annually visit and use Montana resources, are important contributors to the overall health of the Montana economy.

- Socio-economic data includes the per capita income figure for the emphasis area: $17,715. The statewide per capita figure was $21,229, while the total U.S. figure was $27,203. Per capita income has been increasing in the emphasis area at roughly a 5.0 percent annual rate.
- Vegetation varies within a wide range of plant communities: grasslands, shrublands, forests, and riparian areas.
- Visual resources in the analysis area are diverse and of high importance, both to residents and to the many visitors to Montana.
- Wildlife include mammals such as elk, mule deer, white-tailed deer, and pronghorn; bird species, including waterfowl, raptors, and songbirds (many of which are neotropical migrants); reptiles and amphibians; and many species are either listed for protection or are of special management concern, including sage grouse, mountain plover, prairie dogs, gray wolf, Canada lynx, and the grizzly bear.

Chapter 4: Environmental Consequences

This chapter of the FEIS presents the scientific and analytical information that supports conclusions about the potential impacts of the alternatives analyzed. This information is then summarized in a comparative form in Table 2-3 (provided at the end of this Summary as Table S-2).

The resource impacts summarized in this section focus on the most important impacts of Alternative E—Preferred CBM Development Alternative. Alternative E is the one that the BLM and the State currently consider to be "preferred" (that is, the alternative that the BLM and Montana will likely select in their respective RODs following issuance of the FEIS).

Resources with Low Intensity Impacts

As shown in Table S-2, potential impacts on some resources are of low intensity and do not change much, if at all, among alternatives. Impacts of this sort do not help readers distinguish between alternatives.

This similarity among alternatives occurs because the alternatives are programmatic in nature. Programmatic alternatives do not and cannot reflect actual conditions at specific sites. The APD process is used to verify that the BLM and the State have considered actual site conditions before issuing an APD. Resources with low intensity and similar impacts include the following:

- Cultural Resources
- Environmental Justice
- Geology and Minerals
- Livestock Grazing
- Paleontological Resources
- Solid and Hazardous Wastes
- Wilderness Study Areas

Resource Impacts that are Important Features of Alternative E

The following sections highlight those impacts that would help readers understand the context and intensity of the actions included in Alternative E. For more information about these impacts, see the full text of Chapter 4 in the FEIS.

Air Quality

Alternative E project emissions would not alone cause a potential violation of National or Montana Ambient Air Quality Standards (NAAQS/MAAQS) or Prevention of Significant Determination (PSD) Class I/Class II Increments. However, impacts on visibility at several (15) Class I and Class II areas, including the Northern Cheyenne, Crow, and Fort Belknap Indian Reservations, have been predicted through modeling.

Although the air quality modeling shows the potential for exceedances of certain standards, these impacts would not occur. The air quality permitting process would be used to analyze emission sources at the project level for CBM development. Emission sources that would violate standards would not be permitted by the agencies. Thus, the residual impacts to air quality would remain within standards.

Hydrological Resources

Surface Water

Surface water quality would be slightly altered from current water quality conditions, which are generally good. Downstream uses would not be diminished. Surface water flows moderately increase from existing flows, causing some minimal riparian erosion.

Groundwater

Groundwater drawdown of more than 20 feet is anticipated to extend 4 to 5 miles from the edge of production. However, this value may vary, depending on the intensity of CBM development and site-specific conditions. Minor impacts on shallow groundwater quality could occur, due to some infiltration from impoundments and from on-surface recharge of production water.

Beneficial Reuse

The required use of Water Management Plans would increase beneficial reuse of production waters (more than 20 percent of the production water from a given well).

Indian Trust Assets

Impacts on Indian trust assets would be mitigated, as with the preceding discussion of surface water, groundwater, and beneficial reuse management requirements. With regards to Tribal CBM resources, mitigation and monitoring measures would protect the resources of the Tribes. Wildlife monitoring and protection measures would be employed to prevent the loss of important hunting, fishing, and plant gathering locations.

Lands and Realty

Impacts would result from ground disturbance associated with roads, utility corridors, and CBM drill pads. The land disturbed by CBM activities could range from approximately 44,000 acres (long-term) to as many as 74,000 acres (short-term). These acreages are less than 1 percent of the 16 county emphasis area analyzed (approximately 25 million acres in the 16 counties).

Recreation

Adverse impacts from roads, utility corridors, and well pads would be balanced by the increased road access. The overall impacts of Alternative E would be limited in intensity and would vary greatly from site to site.

Social and Economic Values

Exploratory and production wells could result in some new employment opportunities and some associated increases in population, but the overall percentage increase would be less than 1 percent. These impacts would be economically beneficial, but the social impacts could be either beneficial or adverse.

Soils

Disturbance to soils would be minor, based on the estimate that only 44,000 acres (long-term) would be disturbed by CBM activities. Changes in soil chemistry would also be minimal, based on the control of production water discharges and water quality protection measures.

Vegetation

Alternative E would potentially disturb nearly 74,000 acres in the initial short-term period. Of this, approximately 66,500 acres would be native vegetation consisting of 29,000 acres of grassland, 18,000 acres of shrubland, 16,000 acres of forest land, and 3,500 acres of barren land. Noxious weed controls would be employed to control the potential spread of these unwanted species. This disturbance is less than 1 percent of the acreage in the emphasis area.

Visual Quality

Visual impacts would be moderate in nature and, in some cases, permanent. For example, power line access corridors are likely to be permanent and highly visible. Required management actions (mitigations) would lessen the impacts on visual quality by employing camouflage techniques and limiting development on certain visual resource classified areas.

Wildlife

Direct impacts on wildlife would include habitat loss, death from collisions with vehicles, and disturbance from human access.

The impacts on special status species have been summarized in the FWS letter received September 4, 2002. A portion of the letter is summarized below:

> "We concur with your determinations that the proposed action is likely to adversely affect the threatened bald eagle, and the proposed mountain plover. Although the BLM has determined that implementation of proposed changes in coal bed methane is likely to affect the black-tailed prairie dog *(Cynomys ludovicianus)*, we concur with your determination that the action is not likely to adversely affect the black-footed ferret (*Mustela nigripes*).
>
> "This concurrence is based upon the BLM's commitments to 1) locate project activity to avoid impacts to prairie dog colonies that meet FWS criteria as black-footed ferret habitat

(FWS 1989), 2) conduct ferret surveys in suitable habitat, following current lease stipulations for oil and gas development, and 3) if a black-footed ferret or its sign is found during a survey, all development activity would be subject to recommendations from the *Montana Black-footed Ferret Survey Guidelines, Draft Managing Oil and Gas Activities in Prairie Dog Ecosystems with Potential for Black-footed ferret Reintroduction* and re-initiation of Section 7 Consultation with the Service.

"The Service also concurs with your determination that the action is not likely to adversely affect the threatened Ute ladies'-tresses orchid (*Spiranthes diluvialis*), the pallid sturgeon *(Scaphirhynchus albus)*, and the Montana arctic grayling *(Thymallus arcticus)*. The Service gives its concurrence to BLM's determination of "no effect" for the Canada lynx *(Lynx canadensis)*, gray wolf *(Canis lupus)*, interior least tern *(Sterna antillarum athalassos)*, and the warm spring zaitzevian riffle beetle *(Zaitzevia thermae)*." (FWS 2002.)

A copy of the letter is included in the Wildlife Appendix of the FEIS.

Chapter 5: Consultation and Coordination

The BLM and the State conducted extensive consultation and coordination and provided opportunities for public comment during FEIS preparation. Public comment periods are intended to provide interested and concerned individuals opportunities to express their concerns and issues related to decisions the BLM and the State should make.

NEPA scoping and consultation included federal agencies, state departments, and Native American tribes. Key steps and dates in the consultation and coordination were as follows:

- The BLM published a Notice of Intent in the *Federal Register*, informing the public and other agencies that the EIS process is beginning (December 19, 2000).
- The BLM and the State held joint scoping meetings and circulated written requests for information and questions (January and February 2001).
- The BLM and the State met with FWS and with other federal agencies, including the agencies that are official cooperators in the EIS process. The BLM and the State also met with the Crow Tribe of Indians, and the Northern Cheyenne Tribe throughout 2001.
- The BLM and the State issued the Draft EIS (DEIS) and solicited comments on the DEIS (February – May 2002).
- The BLM and State held six public hearings throughout the emphasis area to collect public comments.
- Some 18,000 comments on the DEIS were submitted; approximately 8,800 of these comments directly addressed the BLM and Montana actions affecting CBM exploration and development (February through May 2002).
- BLM and the State of Montana issue the FEIS, incorporating revisions and responses to agency, Native American, and public comments (January 2003).

TABLE S-2
COMPARISON SUMMARY OF IMPACTS

Resource Topic	Alternative A No Action (Existing CBM Management)	Alternative B CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife and Cultural Resources	Alternative C Emphasize CBM Development	Alternative D Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E Preferred CBM Development Alternative
Air Quality					
Existing air quality throughout most of the analysis area is in attainment with all ambient air quality standards. However, three areas have been designated as federal nonattainment areas where the applicable standards have been violated in the past: Lame Deer (PM_{10} – moderate) and Laurel (SO_2 – primary), Montana; and Sheridan, Wyoming (PM_{10} – moderate).					
	• Localized short-term increases in CO, NO_x, SO_2, $PM_{2.5}$ and PM_{10} concentrations. • Maximum concentrations are expected to be below applicable state and National Ambient Air Quality Standards and PSD increments for near-field and far-field modeling. • Potential direct impact on visibility within one mandatory federal PSD Class I, one Class II Area and the Class II Crow IR.	• Localized short-term increases in CO, NO_x, SO_2, $PM_{2.5}$ and PM_{10} concentrations. • Maximum concentrations are expected to be below applicable state and NAAQS and PSD increments for near-field and far-field modeling. • Potential direct visibility impacts within seven mandatory federal PSD Class I Areas and the Northern Cheyenne Reservation. Additional visibility impacts to seven federal PSD Class II areas including the Crow and Fort Belknap Indian Reservations and three Wilderness Areas and one National Recreation Area and one National Monument.	• Impacts under Alternative C are expected to be comparable to those describe for Alternative B but somewhat increased in severity due to the lack of control over operators choose for compressor fuel, reduced limits on compressor hook ups and the lack of enforceable control measures.	• Localized short-term increases in CO, NO_x, SO_2, $PM_{2.5}$ and PM_{10} concentrations. • Maximum concentrations are expected to be below applicable state and NAAQS and PSD increments for near-field and far-field modeling. • Potential direct visibility impacts within one mandatory federal PSD Class I Areas. Additional visibility impacts to three PSD Class II areas including the Crow Indian Reservation, one Wilderness Area and one National Recreation Area	• Impacts modeled for Alternative E would be comparable to those describe for Alternative B but are somewhat decreased in severity due to the use of gas-fired compressors and maximized compressor hook ups. • Although the air quality modeling shows the potential for certain standards to be exceeded, these impacts would not occur. The air quality permitting process would be used to analyze emission sources at the project level. Emission sources that would violate standards would not be permitted by the agencies and therefore, residual impacts would remain within standards
	• Cumulative Impacts: – Potentially exceed the 24-hour PM_{10} NAAQS and PSD Class II increments south of Spring Creek Mine. – Potentially exceed PSD Class I increments for 24-hour PM_{10} on the Northern Cheyenne Reservation. – Potentially exceed atmospheric deposition thresholds in the very sensitive Upper Frozen Lake in the PSD Class I Bridger Wilderness Area.	• Cumulative Impacts: – Potentially exceed the 24-hour PM_{10} and $PM_{2.5}$ NAAQS south of Spring Creek Mine. Potentially exceed the PSD Class II increments for 24-hour PM_{10} south of Spring Creek Mine. Potentially exceed PSD Class I increments for 24-hour PM_{10} on the Northern Cheyenne Reservation and at Washakie. Potentially exceed PSD Class I increments for annual NO_2 on the Northern Cheyenne Reservation.	• Cumulative Impacts: – Same as Alternative B	• Cumulative Impacts: – Potentially exceed the 24-hour PM_{10} and $PM_{2.5}$ NAAQS south of Spring Creek Mine. Potentially exceed the PSD Class II increments for 24-hour PM_{10} south of Spring Creek Mine. – Potentially exceed PSD Class I increments for 24-hour PM_{10} on the Northern Cheyenne Reservation and Washakie WSA	• Cumulative Impacts: Same as Alternative B

TABLE S-2
COMPARISON SUMMARY OF IMPACTS

Resource Topic	Alternative A No Action (Existing CBM Management)	Alternative B CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife and Cultural Resources	Alternative C Emphasize CBM Development	Alternative D Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E Preferred CBM Development Alternative
Air Quality (cont'd.)					
	– Potential visibility impacts in 10 of 17 federal PSD Class I including the Crow and Fort Peck Indian Reservations. Additional visibility impacts to 7 of 13 PSD Class II sensitive areas including the Crow and Fort Belknap Indian Reservations.	– Potentially exceed atmospheric deposition thresholds in the very sensitive Upper Frozen Lake in the PSD Class I Bridger Wilderness Area and Florence Lake in the Class II Cloud Peak Wilderness Area. – Potential visibility impacts in all federal PSD Class I and II sensitive areas including the N. Cheyenne, Fort Peck, Fort Belknap and Crow Indian Reservations.		– Potentially exceed atmospheric deposition thresholds in the very sensitive Upper Frozen Lake in the PSD Class I Bridger Wilderness Area. – Potential visibility impacts in 14 of 17 federal PSD Class I and all Class II sensitive areas including the N. Cheyenne, Fort Peck, Fort Belknap and Crow Indian Reservations.	
Cultural Resources *Approximately 73,600 cultural resource sites exist above known coal resources within the CBM emphasis area*					
	• An estimated 17 cultural resource sites could be identified during foreseen CBM activities. Of these only one or two would likely be eligible for the NRHP.	• The number of cultural resource sites identified would be practically the same for Alternatives B, C, D, and E based on the level of development, associated area of disturbance and minor differences between the alternative realty management actions. An estimated 630 cultural resource sites would be identified, of these sites, 120 to 170 could be found eligible for the NRHP.			
	• Cumulative Impacts: – An estimated 4,285 cultural sites would be identified, resulting in 430 to 612 sites likely eligible for the NRHP. – Identification of TCPs would increase with the development of CBM.	• Cumulative Impacts: – An estimated 5,135 cultural sites could be identified resulting in 515 to 735 sites that could be eligible for the NRHP. – Identification of TCPs would increase with the development of CBM.			

TABLE S-2
COMPARISON SUMMARY OF IMPACTS

Resource Topic	Alternative A No Action (Existing CBM Management)	Alternative B CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife and Cultural Resources	Alternative C Emphasize CBM Development	Alternative D Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E Preferred CBM Development Alternative
Environmental Justice *Executive Order 12898 requires the non-discriminatory treatment of minority and low-income populations for projects under the jurisdiction of a federal agency*	• No adverse impacts with the exception of the undetermined Wyoming discharge influence. It is concluded that no adverse human health or environmental effects would be expected to fall disproportionately on minority or low-income populations from this alternative.	• No adverse human health impacts are foreseen from these environmental changes. The influence of Wyoming's discharge on Montana river's would constitute a potential environmental justice issue if unresolved. No adverse human health or environmental effects would be expected to fall disproportionately on minority or low-income populations from this alternative.	• Same as B except for adverse environmental effects would be expected from downstream water quality changes resulting in limitations to subsistence living styles. These limitations would fall disproportionately on minority or low-income populations from this alternative. Wyoming Discharge issues same as Alternative B	• No adverse human health or environmental effects would be expected to fall disproportionately on minority or low-income populations from this alternative. Wyoming Discharge issues same as Alternative B	• No adverse human health or environmental effects would be expected to fall disproportionately on minority or low-income populations from this alternative. • Impacts would be mitigated as described under the *Environmental Justice* section, *Alternative A* and by implementation of the Project Plan of Development requirements.
Geology and Minerals *Montana's mineral resources are intimately tied to the complex geologic framework of the state. Locatable minerals and conventional Oil and Gas resources are found throughout the planning area in various recoverable and non-recoverable amounts*	• Federal: Only minor loss of CBM during testing operations.	• Federal: – Irretrievable commitment of CBM resources from production, magnitude and complexity to reflect increase scale of development. Potential mineral drainage between Federal mineral estates and state, fee and Tribal developments depending on site-specific conditions. – The presence of shallow CBM production could delay or interfere with certain types of seismic prospecting for conventional oil and gas reservoirs.	• Federal: – Same as Alternative B with the addition of increased water drawdown and potential operational interference within and adjacent to coal mines without the 1-mile buffer zone.	• Federal: Same as Alternative B	• Federal – Same as Alternative B with the addition of increased water drawdown and potential operational interference within and adjacent to coal mines without the 1-mile buffer zone. Protection of potential Tribal CBM from drainage because of resource protection protocols.

TABLE S-2
COMPARISON SUMMARY OF IMPACTS

Resource Topic	Alternative A No Action (Existing CBM Management)	Alternative B CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife and Cultural Resources	Alternative C Emphasize CBM Development	Alternative D Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E Preferred CBM Development Alternative
Geology and Minerals (cont'd.)					
	• State: – Irretrievable commitment of CBM resources from CX Ranch Field production. – Delayed development or expansion of conventional oil and gas, coal mining, and surface mineral mining in minor instances with no interruption to existing activities. – CBM production dewatering at nearby coal seams, in rare occurrences can cause underground coal fires, methane seeps, and the liberation of methane to water wells.	• State: – Increased commitment of CBM resources due to increased level of CBM. – Mineral drainage and seismic interference issues same as for Federal under this alternative.	• State: – Same as Alternative B. – Potential mineral drainage between federal mineral estates and state, fee, or Tribal developments depending on site-specific conditions.	• State: – Same as Alternative B. – Potential mineral drainage between Federal mineral estates and state, fee, or Tribal developments depending on site-specific conditions.	• State: – Same as Alternative B. – Potential mineral drainage between federal mineral estates and state, fee or Tribal developments depending on site-specific conditions.
	• Cumulative Impacts: – Reduction in Coal resources from current and planned surface mine operations. – Potential CBM drainage along Wyoming Montana State Line.	• Cumulative Impacts: Increase in wells and infrastructure could impact existing mine expansion greater possibility of CBM drainage than A.	• Cumulative Impacts: Impacts increased over alternative B.	• Cumulative Impacts: – Same as Alternative B.	• Cumulative Impacts: Similar to Alternative B. – Potential mineral drainage between federal mineral estates and state, fee, or Tribal developments depending on site-specific conditions.
	Number of wells predicted for analysis purposes. • Federal/State – up to 925 CBM and 1720 Conventional wells. • Cumulative – up to 925 CBM and 1775 Conventional wells.	• Federal/State up to 18,275 CBM and 1720 Conventional wells. • Cumulative – up to 26,475 CBM and 1775 Conventional wells.	• Federal/State – up to 18,275 CBM and 1720 Conventional wells. • Cumulative – up to 26,475.CBM and 1775 Conventional wells.	• Federal/State – up to 18,275 CBM and 1720 Conventional wells. • Cumulative – up to 26,475 CBM and 1775 Conventional wells.	• Federal/State – up to 18,275 CBM and 1720 Conventional wells. • Cumulative – up to 26,475 CBM and 1775 Conventional wells.

TABLE S-2
COMPARISON SUMMARY OF IMPACTS

Resource Topic	Alternative A No Action (Existing CBM Management)	Alternative B CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife and Cultural Resources	Alternative C Emphasize CBM Development	Alternative D Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E Preferred CBM Development Alternative
Hydrological Resources *Surface water* The Tongue River has generally good quality water with a seasonal flow consistent from year to year and is frequently used for irrigation The Powder and Little Powder Rivers are characterized as having fair to poor quality water and can and do go dry, the waters are used for stock and limited irrigation *Groundwater* Regional groundwater is available in stream bottoms and alluvium, but becomes scarce away from the water course Coal beds and interlayered sands are the most commonly used aquifers away from riparian areas Groundwater quality is variable and effects taste and beneficial uses *Beneficial Reuse* The southeastern region of Montana is classified as a high plains desert environment and has experienced drought conditions for the past seven years	• Federal: No impacts to surface or groundwater resources. No beneficial reuse • State: Negligible increase in surface water flow and quality changes in the Tongue River. No change in other waterways. Groundwater drawdown within the immediate vicinity of the CX Ranch. Continued beneficial reuse of produced water at the CX Ranch.	• Surface Water – Surface water quality and quantity changes should be the same as Alternative A due to injection control.	• Surface Water – Surface water quality in some watersheds would be noticeably altered, resulting in restricted downstream uses. Surface water flow would be considerably increased in some watersheds causing persistent riparian erosion, changes in watercourses and increased sedimentation.	• Surface Water Surface water quality would not be altered due to required treatment prior to discharge – Surface water flow would be similar to Alternative C but with slight increase in volume due to reduced conveyance loss.	• Surface Water Surface water quality would be slightly altered, however downstream uses would not be diminished. Surface water flow would be moderately increased causing some riparian erosion, as well as increased sedimentation

TABLE S-2
COMPARISON SUMMARY OF IMPACTS

Resource Topic	Alternative A No Action (Existing CBM Management)	Alternative B CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife and Cultural Resources	Alternative C Emphasize CBM Development	Alternative D Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E Preferred CBM Development Alternative
Hydrological Resources (cont'd.)					
		• Groundwater: – Groundwater will be drawn down over time in the Powder River Basin. – Isolated areas of development would experience an increased drawdown effect. – Immediate drawdown of coal seam aquifers would be minor and limited in horizontal extent. As CBM. production matures, coal seam aquifer drawdown could exceed 20 feet and reach as far as 4 to 5 miles from the edge of production. – No change in groundwater quality.	• Groundwater: – Drawdown same as Alternative B. – Alluvial groundwater quality would be altered due to infiltration of untreated production water.	• Groundwater: – Drawdown same as Alternative B – No groundwater quality impacts.	• Groundwater. – Drawdown would be the same as Alternative B. – Minor impacts to shallow groundwater quality from impoundment infiltration and surface discharge of some untreated production water.
		• Beneficial Reuse: – Same as Alternative A.	• Beneficial Reuse: – Same as Alternative A.	• Beneficial Reuse: – Increased availability of treated water for a variety of downstream and increased beneficial uses, estimated at 20% of production.	• Beneficial Reuse: – Required Water Management Plans from all operators would result in increased beneficial reuse of production water, estimate at 20%.

TABLE S-2
COMPARISON SUMMARY OF IMPACTS

Resource Topic	Alternative A No Action (Existing CBM Management)	Alternative B CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife and Cultural Resources	Alternative C Emphasize CBM Development	Alternative D Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E Preferred CBM Development Alternative
Hydrologic Resources (cont'd.)					
	• Cumulative Impacts: – Surface Water: Wyoming's discharge of CBM production water would increase surface water flow in Montana rivers depending on the season and watershed from minor to noticeable amounts. The surface water quality in the three-shared rivers between Montana and Wyoming would be slightly altered, however downstream uses will not be diminished Groundwater: Drawdown of groundwater from Wyoming CBM operations could extend several miles north into Montana. Groundwater quality in Montana would not be impacted by Wyoming CBM operations Drawdown from the CX Ranch may extent out several miles from the development.	• Cumulative Impacts: Surface water flow and quality will be the same as Alternative A CBM production in Montana coupled to nearby Wyoming wells would noticeably increase the drawdown of groundwater aquifers.	• Cumulative Impacts: Surface water quality in some watersheds would be noticeably altered, resulting in restricted downstream uses. – Surface water flow would be considerably increased in some watersheds causing persistent riparian erosion, changes in watercourses and increased sedimentation. Impacts to groundwater drawdown, quality and beneficial reuse would be the same as in Alternative B	• Cumulative Impacts: Surface water quality would not be degraded and minor impacts from Wyoming would be diluted – Surface water flow impacts would be similar to Alternative C with added volume due to reduced conveyance loss. Impacts to groundwater drawdown and quality would be the same as in Alternative B Increased beneficial reuse, estimated at 20% of production.	• Cumulative Impacts: Cumulative impacts would be dependent on WDEQ/MDEQ Water Quality Agreement and MDEQ non-degradation numerical standards. Surface water quality would be slightly altered however downstream uses would not be diminished. Surface water flows would be moderately increased in some watersheds and provide a source of flow in some rivers that would otherwise have gone dry seasonally – Impacts to groundwater drawdown would be the same as Alternative B – Shallow groundwater quality would be slightly altered due to impoundment infiltration and surface discharge of untreated production water – Use of Water Management Plans and agency approval would result in increased beneficial reuse, estimated at 20%.

TABLE S-2
COMPARISON SUMMARY OF IMPACTS

Resource Topic	Alternative A No Action (Existing CBM Management)	Alternative B CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife and Cultural Resources	Alternative C Emphasize CBM Development	Alternative D Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E Preferred CBM Development Alternative
Hydrological Resources (cont'd.)					
	– Beneficial Reuse: Due to the increased water volumes from Wyoming's discharge there would be added opportunities for irrigation, stock watering and other uses from waterways, depending on the water quality.				
Indian Trust and Native American Concerns *Indian Trust Assets (ITAs) are official interests in assets held in trust by the federal government for Indian tribes or individuals. The U.S. Department of the Interior (DOI) Departmental Manual 303 DM 2 defines ITAs as lands, natural resources, money, or other assets held by the federal government in trust or that are restricted against alienation for Indian tribes and individual Indians.*	• Federal: – No measurable impacts to Indian trust assets would occur from the CBM activities.	• Federal: – No surface water quality impacts foreseen. – Potential CBM drainage, dependent on specific site conditions, delayed by buffer zone. – Visibility impacts. – Wildlife Adaptation resulting in changes. – Potential cultural resource impacts to TCPs.	• Federal: Potential for surface water quality and quantity impacts. – Potential CBM drainage, same as Alternative B. – Cultural Resource impacts same as B. – Visibility impacts.	• Federal: – Groundwater drawdown same as Alternative B. – Surface water quality impacts reduced by source treatment, increased availability of surface waters for irrigation and other beneficial uses. – Increased surface water flow could result in increase riparian erosion. – Potential CBM drainage, same as Alternative B. – Cultural Resource impacts same as B. – Visibility impacts.	• Federal: – Effects from groundwater drawdown mitigated because of resource protection protocols. Potential CBM drainage mitigated through the use of resource protection protocols. – Surface water quality impacts reduced with increased availability of surface waters for irrigation and other beneficial uses. – Increased surface water flow could increase riparian erosion. – Air Quality and visibility impacts alleviated through site specific permits and mitigation.

TABLE S-2
COMPARISON SUMMARY OF IMPACTS

Resource Topic	Alternative A No Action (Existing CBM Management)	Alternative B CBM Development with Emphasis on Soil, Water, Air, Vegetation, Wildlife and Cultural Resources	Alternative C Emphasize CBM Development	Alternative D Encourage CBM Exploration and Development While Maintaining Existing Land Uses	Alternative E Preferred CBM Development Alternative
Indian Trust and Native American Concerns (cont'd.)					
	• State: – No measurable impacts to Indian trust assets would occur from the CBM activities	• State: – Groundwater drawdown inward from reservation boundaries. – Limited short-term surface water impacts from spills and ruptures adjacent to Reservations. – Potential CBM drainage, dependent on specific site conditions, no delay due to adjacent development	• State: – Groundwater drawdown same as Alternative B Surface water quality and quantity impacts. – Potential CBM drainage, same as Alternative B	• State: – Groundwater drawdown same as Alternative B. – Surface water quality impacts reduced. – Potential CBM drainage, same as Alternative B	• State: – Surface water quality protected.
	• Cumulative Impacts: Reduction in Coal resources from the Absaloka Mine operation Surface water quality and quantity in the Tongue River would not be noticeable altered from Wyoming CBM development Drawdown of groundwater from Wyoming CBM operations has the potential to lower aquifer levels on the Crow Reservation. – Potential CBM drainage along southeastern corner of Crow Reservation from Wyoming operations.	• Cumulative Impacts: – Same as Alternative A – Reduction of CBM resources if developed by Tribes, coupled with land disturbances and associated water impacts. – Changes in visibility – Air Quality changes. – Potential air quality impacts to PSD class I 24-hour PM10 increments. – Potential air quality impacts to PSD Class I annual NO_2 increments.	• Cumulative Impacts: Same as Alternative B	• Cumulative Impacts. – Same as Alternative B except no potential air quality impacts to PSD Class I annual NO_2 increments	• Cumulative Impacts: – Same as Alternative B

TABLE S-2
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Lands and Realty	*Emphasis Area Land Ownership: Private 65%, Federal 20%, Tribal 10%, State 5%* *Total Acreage: 25,551,308*		*Miles of Road: Interstate, 440; US; 845; State, 430; Off-System,13,550* *Miles of Railroad: BNSF, 420; MT Rail Link, 190*		
	• Federal: – Minimal land area displaced by roads. – 400 acres disturbed short term during CBM exploration drilling.	• Federal: – Increase fire hazard and motorized access during 20-year lease. – Limit public access. – Disrupt active logging operations. – 25,600 short term acres and 15,250 long term acres disturbed during CBM development activities.	• All Federal and State impacts in Alternative B occur in Alternative C in addition to: – Impacts to adjacent mining operations The land use displacement from roads and utility lines lease operations is greatest in Alternative C. – Increased disturbances by CBM activities on private, state and federal estates. Short term disturbances 70,000 acres (Federal 32, 400, State 37,600); long term disturbances 47,600 acres (Federal 22,000, State 25,600).	• All Federal and State impacts in Alternative B occur in Alternative D in addition to: – Federal: Permanent loss of land use from road network.	• Federal and State: – Levels of disturbance would be slightly increased due to use of impoundments for production water management (Short term 74,000 acres, long term 44,000 acres). – Impacts from powerlines, roads, pipelines, and other utilities not requiring transportation corridors would be the same as Alternative C.
	• State: – Increased motorized access on the CX Ranch. – Increase motorized trespass. – 1,100 short term acres disturbed and 500 long term acres during CBM exploration and production activities.	• State: – Displace agricultural lands and disrupt irrigation system, increase cost of farm operation. – Reduced property values. – Displace community and residential growth. – Increase dust and noise impacts on residential use. – Increase cost of county road maintenance. – Increase long-term motorized access. – invite illegal trespass activities. – Increase forest pests. – Disrupt active logging operations. – Increase motorized trespass. – 29,750 short term acres and 17,700 long term acres disturbed during CBM development activities.			

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Lands and Realty (cont'd.)					
	• Total cumulative long term disturbance including all foreseen projects such as coal mine expansion, transportation etc. is estimated at 34,000 acres.	• Total cumulative acres disturbed long term including all foreseen projects 81,000	• Total cumulative long term acres disturbed would be approximately 102,300.		• Total cumulative long term acres disturbed would be approximately 92,200
Livestock Grazing *AUM is equal to the amount of forage required to support one cow and her calf or 5 sheep for one month* *The CBM Emphasis area has an estimated 1,207,400 acres of classified grazing and forested lands capable of supporting 323,941 AUMs*					
	• Exploration wells located within BLM-permitted rangelands would result in the temporary loss of 69 AUMs • State: – The exploration wells and production wells located at CX Ranch would result in a maximum construction loss of 272 AUMs on state and private rangelands combined. – Re-vegetating parts of the well pads during production would reduce the state-permitted losses to 194 AUMs.	• Exploration wells would result in the temporary loss of 413 AUMs (BLM 163, State 250) • Production wells would result in a maximum construction loss of 11,960 AUMs (BLM 4,770, State 7,190). • Re-vegetating parts of the well pads during production would reduce the losses to 6,904 AUMs (BLM 2,484, State 4,420) • If all Alternative requirements were utilized fully, the area of surface disturbances could be reduced by an additional 35 percent during construction and 40 percent during production primarily because of required transportation corridors.	• Impacts to livestock grazing would be similar to but slightly greater than those in Alternative B due to the discharge of untreated production water on to the ground resulting in increased erosion and no requirements for transportation corridors. • CBM discharge water could be used for livestock watering; increased erosion would result in increased surface disturbance, which could lead to disrupted grazing patterns, undermined fencing, and reduced forage; an increase of noxious weeds and a decrease in forage material could occur if discharged produced water is too high in saline content; and possible health effects to livestock if produced water that is unsuitable for livestock watering.	• Impacts would be similar to Alternative B with some exceptions: disturbed acreage would increase due to the piping of discharge water to the nearest disposal point. There would be a reduction to forage losses from increased land application of produced water; and there would be less soil and forage loss from erosion of soils • Transportation corridor and road impact causing reductions of surface disturbance would be similar to Alternative B	• Impacts to livestock grazing would be similar to Alternative B. Suitable CBM discharge water could be used for livestock watering • Transportation corridor impacts would be the same as Alternative B • Not as much forage would be lost under this alternative because increased land application of produced water would allow more growth. There would also be less soil and forage loss from soils erosion because more vegetation would hold the soils in place.

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Paleontological Resources *Paleontological resources consist of fossil-bearing rock formations that underlie the entire planning area. Fossil outcrops are relatively rare throughout the emphasis area, but know areas are protected.*	• It is unlikely that any of the 1,500 short term acres disturbed during CBM development activities would contain noteworthy paleontological resources. The 575-acre Bridger Fossil Area ACEC (only paleontological resource) would not be disturbed. • Other impacts would include vandalism and removal of fossils by amateur fossil collectors resulting from minor increased accessibility to remote areas.	• Impacts for Alternative B, C, D, and E would be nearly the same based on level of disturbance, known locations of rich fossil areas, geological formation for paleontological features and protected ACECs. • There would be between 55,400 and 74,000 short term acres disturbed during CBM development activities increasing the chances that a minor fossil discovery would be made. Cumulative impacts would disturb an additional 33,400 acres increasing the likelihood of additional fossil discoveries. • Increased access would include increased vandalism and removal of fossils by amateur fossil hunters.			
Recreation *Montana's natural features offer a variety of year-round recreational opportunities*	• Minor loss of land for recreation purposes, and the disruption to recreation activities. • Exploratory activities such as drilling and testing would temporarily displace game species locally.	• Moderate loss of land for recreation purposes and the disruption to recreational activities. • Increased opportunities for access to remote areas.	• Impacts would be similar to Alternative B with the exception that increased erosion could lead to a reduced amount of land available for recreation activities and could disrupt habitat for game species.	• Impacts would be similar to Alternative B.	• Impacts would be similar to Alternative B with the exception that no requirements for transportation corridors would moderately increase access to remote areas.

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Socio-Economics *Socio-economics address the changes in demographics; social organization including housing attitudes, and lifestyles; economics such as employment, unemployment and per capita income, and, government revenue sources including taxes, state oil and gas lease income, federal mineral revenues and private landowner revenues*	• No social impacts (only small changes in employment, population, demand for services, etc.). • Small impact on economic conditions as a result of new production wells.	• Social impacts would include new jobs and new population moving to the area. • Economic impacts include generation of new personal and government income. • Additional disposal costs associated with injection of produced water. • Additional demands on public services.	• Social impacts same as Alternative B, with increase in impacts on lifestyles and values. • Economic impacts same as Alternative B, with increase in impacts to water resource users.	• Social impacts same as Alternative B, with small increase in impacts on lifestyles and values. • Economic impacts same as Alternative B, with small increase in impacts to water resource users.	• Social impacts same as Alternative B, with the exception that public burden to maintain roads may increase depending on landowner access decisions. • Economic impacts same as Alternative B, except that oil and gas income may be less depending on water treatment costs.
Soils *Montana has a wide mix of geologic parent material, which produces a vast array of different soil types*	• There would be minor occurrences of soil erosion, runoff, and sedimentation, mostly during construction activities. • Approximately 1,500 acres would be disturbed short term during CBM exploration and construction activities. • 500 acres would be disturbed longer term during production, with a majority of the land reclaimed after production is ceased	• Soil disturbances could be reduced by 35 percent or higher on a per well basis over Alternative A. CBM activities would result in 55,400 short term acres being disturbed. • 32,950 acres would be disturbed longer term during CBM production, with a majority of the land reclaimed after production is ceased. • No impacts would occur made to soils from CBM waters.	• CBM development activities would disturb corridors. Approximately 70,000 short term acres of disturbed surface area during construction activities. • Surface discharge and irrigation of produced water could result in approximately 47,600 acres disturbed in the long term.	• Impacts including levels of disturbance would be similar to Alternative B. • One favorable side effect would be that more water would be available for irrigation.	• Impacts would be similar to Alternative B. There would be a slight increase in the level of disturbance due to increased use of impoundments to contain produced water. Short term acres disturbed would be approximately 74,000 while long term would be 44,000. • Produced water would be available for beneficial use including irrigation. • No impacts are expected to occur on irrigated lands or soils

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Solid and Hazardous Wastes *Solid and hazardous wastes are under the jurisdiction of the MDEQ for RCRA wastes, MBOGC for RCRA exempt wastes, and the EPA for wastes generated on tribal lands*	• Typical solid waste refuse can be disposed of in local landfills. • Drilling mud and cuttings can be disposed of onsite with the landowner's permission. • Minor impacts would also occur from the use of pesticides and herbicides during access and construction activities. • Cumulative impacts from other foreseen projects would result in increased waste generated at moderate levels for commercial disposal.	• Impacts for Alternative B, C, D, and E would include increased quantities of waste requiring onsite disposal or transportation to commercial landfills • Oil and gas developers are responsible for any damages to property, real or personal, resulting from the lack of ordinary care during operations. Operators are required to maintain SPCC plans and immediately remove and spilled or unused non-exempt wastes from the sites therefore no long term impacts to private, state or federal lands would occur from waste products associated with CBM development.			
Vegetation *Emphasis area acreage by land classifications, overlying known coal reserves: Grasslands, 3.55 million; Shrublands, 1.8 million; Forests, 1.36 million; Riparian Areas, 378,000; Barren Lands, 372,000; and Other Areas, 700,000*	• 1,144 acres of native habitat would be impacted under this Alternative, more than half (580 acres) in grasslands. • Potential minor loss of plant diversity with reclamation. • On non-federal land, Ute ladies'-tresses could be slightly impacted by disturbances.	• 55,400 acres of native habitat could be impacted short term under this Alternative, more than half (21,450 acres) in grasslands. • Potential moderate loss of plant diversity with reclamation. • On non-federal land, Ute ladies'-tresses could be impacted by disturbances.	• 70,000 acres of native habitat could be impacted short term under this Alternative, more than half (27,300 acres) in grasslands. • If SAR values exceed 10 in water, riparian vegetation would be impacted, affecting as many as 3,535 acres of riparian habitat. • Potential loss of plant diversity with reclamation. • On non-federal land, Ute ladies'-tresses could be impacted by disturbance, SAR values, and water level changes, particularly inundation.	• Native habitat disturbances would be similar to those discussed under Alternative B. • Hydrology changes may affect as much as 2,776 acres of riparian habitat due to increased stream flow. • Potential loss of plant diversity with reclamation. • On non-federal land, Ute ladies'-tresses could be impacted by disturbance and water level changes, particularly inundation.	• Impacts would be similar to those for Alternative D, however no riparian habitat would be affected. Short term impacts would be slightly increased (74,000 acres) due to the use of impoundments for water management practices.

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Visual Resource Management *Visual resources include Montana features such as landform, water, vegetation, color, adjacent scenery, uniqueness, structures and man-made features of aesthetic value*	• Federal and State: – Dust emissions would reduce visibility to a small degree near active field operations. – Well pads, roads, and compressors would disrupt the visual landscape. Semi-permanent structures are designed to blend into the surrounding environment. – Drill rigs, two-track trails, heavy road-making equipment, and generators would disrupt the visual landscape short-term.	• Federal: – There would be impacts to VRM BLM Class III and IV areas only. • Type of impacts common to Alternative A would occur with Alternative B, though at a scale commensurate with development. • View shed impacts from road network would last for 20 years and then reclaimed.	• Impacts common to Alternative B would occur with Alternative C, in addition to the following: • Above ground powerlines would greatly impact skyline and viewshed. • Visual impacts from roads and utility lines is greatest with this alternative until reclamation.	• Impacts common to Alternative B would occur with Alternative D, in addition to the following: • Production related roads that are not reclaimed and made part of the permanent road network would result in permanent visual impact.	• Impacts would be reduced from Alternative C by the mitigation measures in the Project Plan of Development for visual resources. • Impacts would be mitigated as described under the Alternative B, *Mitigation* subsection.
Wilderness Study Areas *There are 10 WSAs within the CBM emphasis area*	• BLM WSAs are closed to oil and gas leasing so there would be no direct impacts to WSAs. • Because there would be no production activities in BLM planning areas under this alternative, there would be no impacts	• There would be no direct impacts to WSAs from CBM development.	• Same as Alternative B.	• Same as Alternative B	• Same as Alternative B. • There would be no direct impacts to WSAs from CBM development. • Laws and regulations established for WSAs prohibit leasing of WSAs designated lands for resource extraction

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Wildlife	*Mammal Species:* *- 10 bats* *- 8 shrews* *- 34 small mammals and lagomorphs* *- 17 predators* *- 4 big game* *Bird Species:* *.- 32waterfowl* *- 33 shore & wading birds* *- 18 diurnal &* *- 11 nocturnal raptors* *- 8 gallinaceous* *- 8 wood peckers* *- 137 songbirds* *Reptiles and Amphibian species:* *- 1 salamander* *- 4 frogs* *- 4 toads* *- 3 turtles* *- 2 lizards* *- 9 snakes* *Species of Concern consist of 16 mammals, 6 reptiles and amphibians, and 22 birds, including:* *- Sage Grouse* *- Interior Least Tern* *- Gray Wolf* *- Canada Lynx* *- Grizzly Bear* *- Mountain Plover - Bald Eagle* *- Peregrine Falcon* *- Black-tailed Prairie Dog* *- Black-footed Ferret*				
	• Direct and indirect impacts would occur at a level commensurate with the level of CBM development. • Direct impacts include habitat loss, death from vehicle collisions, and effects associated with greater human access into previously untraveled areas. • Indirect impacts on wildlife include disturbance and displacement, stress, power lines, noxious weed invasion, user-created roads, habitat fragmentation, water quality degradation from road runoff, and increased livestock grazing. • Indirect impacts on wildlife would occur on 33,840 to 84,000 acres. • Through mitigation, this Alternative would not directly impact any T&E listed wildlife species. Potential indirect impacts to T&E species, such as human disturbance, increased poaching or collisions with vehicles, would be low because of the limited number of CBM wells permitted.	• Same as Alternative A but on a much larger scale. Twenty-five times as many wells, roads, and utility corridors as under Alternative A. • 6,680 miles of roads (2.9 to 8.8 miles per square mile). • 20,697 miles of utility corridors (9 to 27.1 miles per square mile). • Indirect impacts to wildlife on 884,000 to 4.7 million acres. • Additional types of impacts include loss of high value habitats such as prairie dog towns, sage grouse leks, and big game winter range. • Loss of intermittent wildlife habitat associated with streams because of groundwater withdrawal. Through mitigation, this Alternative would not directly impact any T&E listed wildlife species. •	• Direct and indirect impacts would occur at a level commensurate with the level of CBM development. Indirect impacts to wildlife on 884,000 to 4.7 million acres from: – 9,018 miles of roads (3.9 to 11.9 miles per square mile). – 27,917 miles of utility corridors (12.2 to 36.6 miles per square mile). – Discharge of untreated CBM water into drainages would impact riparian and wetland habitat and associated species because of poor water quality and erosion. – Increased livestock grazing within 2 miles of CBM discharges that occur in areas without summer water. • Through mitigation, this Alternative should not directly impact any T&E listed wildlife species.	• Impacts would be similar to Alternative B. • Discharged treated CBM water would erode riparian and wetland habitat. • Increased livestock grazing within 2 miles of CBM discharges that occur in areas without summer water. • Through mitigation, this Alternative would not directly impact any T&E listed wildlife species. • Potential indirect impacts to T&E species, such as human disturbance, increased poaching or collisions with vehicles, would occur at a level less than Alternative C. – Potential indirect impacts to T&E species from hydrology changes caused by increased water levels may impact nesting Interior Least Terns. If hydrology changes from surface water runoff, cause riparian vegetation changes, other T&E species may be impacted as well, such as nesting Bald Eagles.	• Direct and indirect impacts would occur similar to Alternative B. • Indirect impacts to wildlife would occur on 884,000 to 4.7 million acres depending on development spacing. • Loss of intermittent wildlife habitat associated with streams because of groundwater withdrawal. • Increased livestock grazing within 2 miles of CBM discharges that occur in areas without summer water. • Through implementation of WMPP & BO impacts to T&E listed species would be minimized. – Species of concern not federally protected may be impacted by habitat changes caused by vegetation removal or access roads that are not fully recovered with reclamation after well abandonment.

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Wildlife (cont'd.)					
	• Species of concern that are not federally protected may be impacted by habitat changes caused by vegetation removal or access roads that are not fully recovered with reclamation after well abandonment.	• Potential indirect impacts to T&E species, such as human disturbance, increased poaching or collisions with vehicles, could occur. Impacts would be less than C or D with the restricting of utilities and roadways to the same corridor. • All species of concern that are not federally protected may be impacted by habitat changes caused by vegetation removal or access roads that are not fully recovered with reclamation after well abandonment and by increased access through increased roads.	• Potential indirect impacts to T&E species, such as human disturbance, increased poaching or collisions with vehicles, are greater under this Alternative than any other because of the increased number of CBM wells permits.. • Potential indirect impacts to T&E species from changes in riparian habitat due to increased SAR values and hydrology are likely to occur under this Alternative. Bald Eagles and Interior Least Terns may also be affected if SAR changes affect forage fish • Species of concern not federally protected may be impacted by habitat changes caused by vegetation removal or access roads that are not fully recovered with reclamation after well abandonment or by changing streambed hydrology and increased SAR and salinity values in water and soil. • More water would be available for wildlife.	– Species of concern that are not federally protected may be impacted by habitat changes caused by vegetation removal or access roads that are not fully recovered with reclamation after well abandonment or by changing streambed hydrology.	– These impacts would be less than alternative B, C and D through the implementation of the Wildlife Monitoring and Protection Plan. – More water would be available for wildlife as a result of CBM production

U.S. GOVERNMENT PRINTING OFFICE: 2002 — 573-102 / 68004 Region No. 8

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Wildlife (Aquatic Resources)	*Fish species vary between watersheds within the CBM emphasis area from 8 in the Little Big Horn River to 32 in the Musselshell River*	*Special Status Aquatic Species:* *- Montana Arctic grayling* *- Pallid sturgeon* *- Warm spring zaitzevian riffle beetle*			
	• Minor short-term impacts on aquatic resources during CBM exploration and production may result from increased sediment delivery and its effects on aquatic habitat and organisms, possible impedance of fish movements, potential for accidental spills of petroleum products, and possibly increased fish harvest. • Relatively minor long-term increases in river flow and TDS concentration from production water discharge would not be expected to impact aquatic resources. • Conditions of MPDES Permits would provide legally enforceable assurances that water quality, aquatic resources, and the beneficial uses of receiving waters would not be degraded by production water discharges. • Impacts from CBM abandonment would be minor and subside over time.	• The same types of impacts described for Alternative A (No Action) would occur under Alternative B • The scale of potential impacts associated with sediment delivery, fish movements, petroleum spills, and fish harvest would be much greater under Alternative B because of the development of over 18,000 CBM wells across a much larger geographic area. • No CBM production water would be discharged to surface drainages under Alternative B and there would be no potential for impacting aquatic resources from this particular activity. • Based on fish species present, fisheries management policies, fisheries resource values, and the projected intensity of CBM development, the drainages most sensitive to the effects of CBM development would be the Lower Bighorn, Upper Tongue, and Little Bighorn; then the Lower Tongue, Little Powder, and Rosebud; followed by the Mizpah. • The potential for affecting aquatic resources in sensitive drainages would be less under Alternative B than under Alternatives C or D.	• The same types of impacts described for Alternative A would occur under Alternative C, but they would occur on a far greater scale because of the development of over 18,000 CBM wells. • A total of 0.67 billion cubic feet of untreated CBM production water would be discharged to drainages each year. Resultant flow and TDS increases could potentially impact aquatic organisms, especially in smaller drainages during dry times of the year. • Conditions of MPDES Permits would provide legally enforceable assurances preventing the degradation of water quality, aquatic resources, and the beneficial uses of receiving waters. • The potential for affecting aquatic resources in the sensitive drainages would be greater under Alternative C than under Alternatives B or D.	• The same types of impacts described for Alternative A would occur under Alternative D, but they would occur on a far greater scale because of the development of over 18,000 CBM wells. • The annual discharge of 2.24 billion cubic feet of treated CBM production water through pipelines or constructed water courses and resultant flow increases could impact aquatic resources in smaller drainages during dry times of the year. • The treatment of CBM production water prior to its discharge would greatly reduce the potential for elevated TDS and salinity impacts on aquatic resources. • MPDES Permits would provide legal assurances that water quality, aquatic resources, and beneficial uses of receiving waters would be protected. • The potential for affecting aquatic resources in the sensitive drainages would be greater under Alternative D than under Alternative B but less than under Alternative C.	• Same as Alternative B. • Implementation of wildlife monitoring and Protection Plan would reduce impacts to aquatic habitat wildlife and invertebrates.